Volunteer Lake Assessment Program Individual Lake Reports

SUNRISE LAKE, MIDDLETON, NH

MORPHOMETRIC DATA

Watershed Area (Ac.):	2,112	**Max. Depth (m):**	4.1	**Flushing Rate (yr^{-1}):**	2
Surface Area (Ac.):	257	**Mean Depth (m):**	1.9	**P Retention Coef:**	0.71
Shore Length (m):	5,500	**Volume (m^3):**	1,966,000	**Elevation (ft):**	666

TROPHIC CLASSIFICATION

Year	Trophic class
1977	OLIGOTROPHIC
1990	MESOTROPHIC

KNOWN EXOTIC SPECIES

Variable Milfoil

The Waterbody Report Card tables are generated from the DRAFT 2014 305(b) report on the status of N.H. waters, and are based on data collected from 2004-2013. Detailed waterbody assessment and report card information can be found at www.des.nh.gov/organizations/divisions/water/wmb/swqa/index.htm

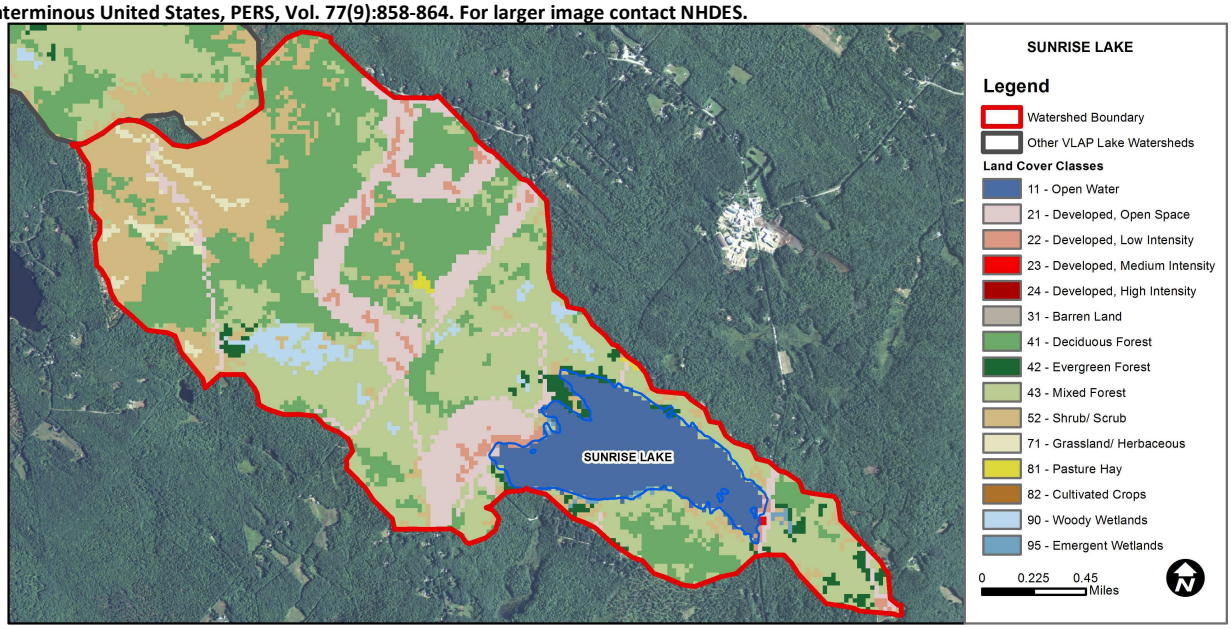
Designated Use	Parameter	Category	Comments
Aquatic Life	Phosphorus (Total)	Slightly Bad	The calculated median is from 5 or more samples and is > indicator and the chlorophyll a indicator is exceeded.
	pH	Slightly Bad	>10% of samples exceed criteria by a small margin (minimum of 2 exceedances).
	Oxygen, Dissolved	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Dissolved oxygen satura	Encouraging	There are < 10 samples with 0 exceedances of criteria. More data needed.
	Chlorophyll-a	Slightly Bad	The calculated median is from 5 or more samples and is > indicator.
Primary Contact Recreation	Escherichia coli	Very Good	Where there are no geometric means, all bacteria samples are < 75% of the geometric mean. Where there are geometric means all single bacteria samples are < the SSMC and all geometric means are < geometric mean criteria.
	Chlorophyll-a	Very Good	There are a total of at least 10 samples with 0 exceedances of indicator.

BEACH PRIMARY CONTACT ASSESSMENT STATUS

SUNRISE LAKE - TOWN BEACH	Escherichia coli	Bad	There are >=1 exceedance(s) of the geometric mean and/or >=2 single sample criterion exceedances. One or more exceedance is >2X criteria.

WATERSHED LAND USE SUMMARY

Fry, J., Xian, G., Jin, S., Dewitz, J., Homer, C., Yang, L., Barnes, C., Herold, N., and Wickham, J., 2011. Completion of the 2006 National Land Cover Database for the Conterminous United States, PERS, Vol. 77(9):858-864. For larger image contact NHDES.



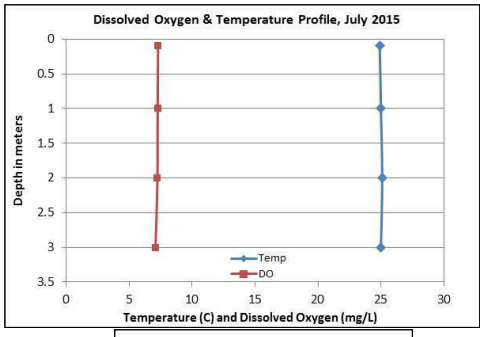
Land Cover Category	% Cover	Land Cover Category	% Cover	Land Cover Category	% Cover
Open Water	10.2	Barren Land	0	Grassland/Herbaceous	1.14
Developed-Open Space	13.2	Deciduous Forest	27.25	Pasture Hay	0.2
Developed-Low Intensity	1.75	Evergreen Forest	2.04	Cultivated Crops	0
Developed-Medium Intensity	0.04	Mixed Forest	26.96	Woody Wetlands	2.24
Developed-High Intensity	0	Shrub-Scrub	14.68	Emergent Wetlands	0.28

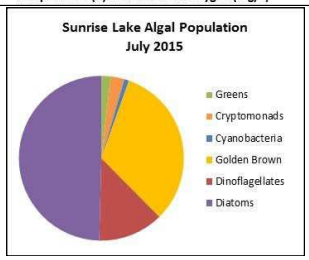
Volunteer Lake Assessment Program Individual Lake Reports
Sunrise Lake, Middleton
2015 Data Summary

Recommended Actions: Increase monitoring frequency to once per month during the summer, typically June, July and August, to better assess seasonal and historical water quality trends and decrease data variability. Water quality was generally within a good range in 2015, however conductivity levels have significantly worsened in the lake. Winter road salting is likely the cause. Educate lake and watershed residents on best practices for salt application on driveways and walkways. Encourage local road agents and winter maintenance companies to obtain Voluntary NH Salt Applicator license through UNH Technology Transfer Center's Green SnowPro Certification program. Boating activity may be disturbing bottom sediments causing increased turbidity. The DES fact sheet WD-WMB-25 "Impacts of Motorized Watercraft on New Hampshire's Waterbodies" is a great educational resource for recreational boaters. Keep up the great work!

Observations (*Refer to Table 1 and Historical Deep Spot Data Graphics)*

- **Chlorophyll-a:** Chlorophyll levels were low in July, less than the state median, and the lowest measured since monitoring began. We hope to see this continue! Historical trend analysis indicates relatively stable chlorophyll levels with moderate variability between years.
- **Conductivity/Chloride:** Deep spot, tributary and cove conductivity and chloride levels were slightly greater than the state medians. Historical trend analysis indicates significantly increasing (worsening) epilimnetic (upper water layer) conductivity since monitoring began.
- **E. coli:** All beach E. coli levels were low and much less than the state standard of 88 cts/100 mL for public beaches.
- **Total Phosphorus:** Epilimnetic and Hypolimnetic (lower water layer) phosphorus levels were within a low range. Epilimnetic phosphorus increased slightly from 2014 but remained much less than the state median. Historical trend analysis indicates relatively stable epilimnetic phosphorus with moderate variability between years. Hampshire Bk., Boat Launch, Pinkham Cove, and Tanglewood Bk. phosphorus levels were all low.
- **Transparency:** Transparency was very good in July and the Secchi disk was visible on the pond bottom utilizing the viewscope (VS). Transparency measured without the viewscope (NVS) was approximately equal to 2014 and the state median, and historical trend analysis indicates highly variable transparency since monitoring began.
- **Turbidity:** Turbidity was slightly elevated at all stations in July. Algal growth, suspended sediments from boating activity and milfoil management, and/or the color of the water can all affect turbidity levels.
- **pH:** Deep spot, tributary and cove pH levels were generally within the desirable range 6.5-8.0 units however deep spot pH levels have historically fluctuated below the desirable range. Historical trend analysis indicates highly variable epilimnetic pH since monitoring began.





Station Name	Table 1. 2015 Average Water Quality Data for SUNRISE LAKE									
	Alk. mg/l	Chlor-a ug/l	Chloride mg/l	Cond. uS/cm	E. Coli #/100ml	Total P ug/l	Trans. m		Turb. ntu	pH
							NVS	VS		
Epilimnion	6.5	3.53	22	103.8		8	3.10	3.55	1.54	6.48
Hypolimnion				104.1		8			1.64	6.50
Bartletts Cove				104.0		8			1.83	6.64
Hampshire Brook			23	104.4		6			1.39	6.60
Hampshire Shores Boat Launch				104.5		7			1.57	6.58
Johns Beach					10					
Main Beach					20					
Nicola Beach					10					
Nicola Beach 1					20					
Pinkham Cove				104.3		6			1.43	6.63
Tanglewood Brook			23	104.3		8			1.75	6.61
Town Beach					10					

NH Water Quality Standards: Numeric criteria for specific parameters. Results exceeding criteria are considered a water quality violation.
Chloride: > 230 mg/L (chronic)
E. coli: > 88 cts/100 mL – public beach
E. coli: > 406 cts/100 mL – surface waters
Turbidity: > 10 NTU above natural level
pH: between 6.5-8.0 (unless naturally occurring)

NH Median Values: Median values for specific parameters generated from historic lake monitoring data.
Alkalinity: 4.9 mg/L
Chlorophyll-a: 4.58 mg/m^3
Conductivity: 40.0 uS/cm
Chloride: 4 mg/L
Total Phosphorus: 12 ug/L
Transparency: 3.2 m
pH: 6.6

Historical Water Quality Trend Analysis

Parameter	Trend	Explanation	Parameter	Trend	Explanation
Conductivity	Worsening	Data significantly increasing.	Chlorophyll-a	Stable	Trend not significant; data moderately variable.
pH (epilimnion)	Stable	Trend not significant; data highly variable.	Transparency	Stable	Trend not significant; data highly variable.
			Phosphorus (epilimnion)	Stable	Trend not significant; data moderately variable.